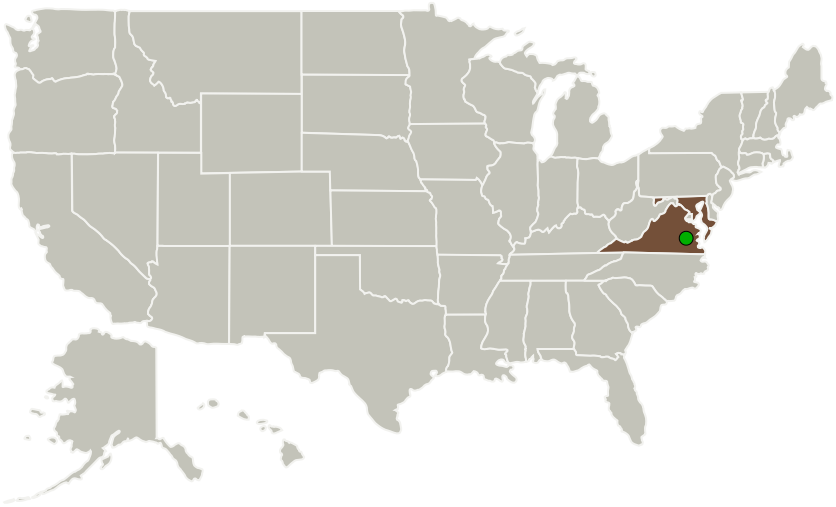
Self-Calibrating High Resolution Tunable Filter for Remote Gas Sensing Applications, Phase I

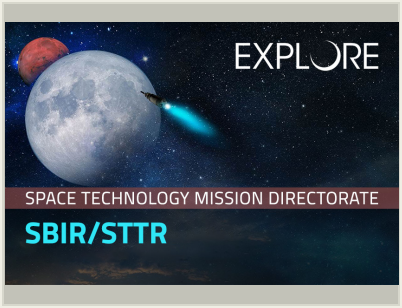
Completed Technology Project (2010 - 2010)

Project Introduction

We propose to develop a compact, robust, optically-based sensor for local and remote sensing of oxygen (O2) at 1.26 µm, carbon dioxide (CO2) at 1.56 µm and other species in spectral region of up to 2ìm with accuracy of the order of 0.5 ≤ 1 ppm, allowing a very high out-of-band rejection of spurious solar background radiation. This sensor will utilize a widely tunable narrowband optical filter in conjunction with a wideband optical source (sun light or a commercially available broadband source) in combination with built-in calibration laser diode to make absorption measurements as well as evaluate atmospheric parameters such as pressure, temperature and density. Proposed instrumentation can be valuable for NASAs ASCENDS program with broad scope applications in the measurement of atmospheric parameters and multi-species concentration measurement including CO2. Instrumentation will be environmentally rugged and compact and will possess auto-calibration capabilities, fast response time (microseconds to milliseconds range) and low-power consumption. Phase I work will involve building and characterizing a complete laboratory scale system so that a final system can be constructed in Phase II. TRL range at onset of Phase I is 2 at end 3-4; Phase 2 at onset 4 at end 5-6.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Brimrose Corporation of America	Lead Organization	Industry	Sparks, Maryland
Langley Research Center(LaRC)	Supporting Organization	NASA Center	Hampton, Virginia

Primary U.S. Work Locations	
Maryland	Virginia

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/139429)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Brimrose Corporation of America

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

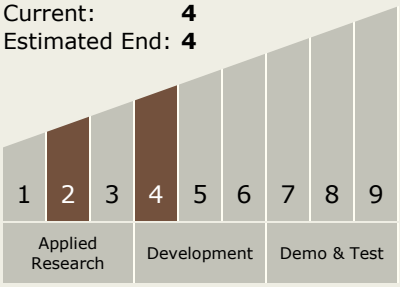
Carlos Torrez

Principal Investigator:

Pranay Sinha

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System